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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/677,867 10/03/00 SHIROTA

K	684,3887
EXAMINER	

005514 MM91/0919
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NEW YORK NY 10112

ART. UNIT	PAPER NUMBER
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DATE MAILED:

09/19/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/677,867

Applicant(s)

SHIROTA ET AL.

Examiner

K. Feggins

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2861

– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) ____ is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5 & 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 6-13, 16-18 & 24-27 rejected under 35 U.S.C. 103(a) as being unpatentable over Klein et al. (5,448,273) in view of Nishikori et al. (5,880,751).

Klein et al. disclose the following claimed limitations:

* an ink jet recording method of ejecting ink using an ink jet head substrate provided with a heat generating resistor which is coated with a protecting film, wherein the ink is ejected by a pressure produced by generation of a bubble created by film boiling of the ink caused by application of thermal energy to the ink through the protecting film, the thermal energy being generated by driving of said heat generating resistor, the improvement residing (Abstract)

* there is provided a recording mode in which the ink is ejected with a maximum temperature at the surface of said protecting film which is contacted to the ink (not higher than 560°C) between 100-600°C (col 7, lines 36-50, figs 2-4)

* wherein said protecting film comprises a plurality of layer, and a layer contactable to the ink is an anti-cavitation film made of amorphous alloy comprising Ta.

* wherein the amorphous alloy comprises one or more metal materials selected from a group of Fe, Cr, Re, Ge and Ni.

* wherein the amorphous alloy comprises Ta, Fe, Cr and Ni, and a content of Ta is not more than 30 weight % on the basis of the total weight of the amorphous alloy.

* an ink jet head substrate comprising a heat generating resistor, a protecting film with which said heat generating resistor is coated, wherein heat generated by said heat generating resistor is applied to ink through said protecting film to eject the ink, the improvement residing (Abstract)

* a maximum temperature at a surface of said protecting film contacted to the ink is (not higher than 560°C) between 100-600°C during driving of said heat generating resistor (col 7, lines 36-50, figs 2-4)

* wherein said protecting film comprises a plurality of layer, and a layer contactable to the ink is an anti-cavitation film made of amorphous alloy comprising Ta.

* an ink jet head comprising an ink jet head substrate including a heat generating resistor, a protecting film with which said heat generating resistor is coated, wherein heat generated by said heat generating resistor is applied to ink through said protecting film to create a bubble in the ink, thereby to eject the ink by a pressure by the creation of the bubble (Abstract),

* maximum temperature at a surface of said protecting film contacted to the ink is (not higher than 560°C) between 100-600°C during driving of said heat generations resistor (col 7, lines 36-50, figs 2-4)

Kline et al. discloses the claimed invention except for a maximum temperature at a surface of said protecting film contacted to the ink not higher than 560°C during driving of said heat generating resistor. It would have been obvious to one having ordinary skill in the art at the time the invention was made to a maximum temperature at a surface of said protecting film contacted to the ink not higher than 560°C during driving of said heat generating resistor, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

3. Claims 2-3, & 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Klein et al. (5,448,273) in view of Nishikori et al. (5,880,751).

Klein et al. disclose all of the claimed inventions except for the following:

* wherein the maximum temperature is controlled by controlling a pulse width of a driving signal applied to the heat generating resistor.

* wherein a temperature of the substrate is measured, driving of heat generating resistor is stopped when a discrimination is made that control is not possible to make

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the maximum temperature (not higher than 560°C) between 100-600°C on the basis of the temperature and a driving signal.

* there is provided driving signal control means for making a maximum temperature at a surface of said protecting film contacted to the ink during driving of said heat generating resistor

* wherein said driving signal control means controls a pulse width of a driving signal applied to said heat generating resistor to control the maximum temperature.

* wherein said ink jet head substrate includes a temperature detecting element for measuring a temperature of said substrate, and wherein driving of heat generating resistor is stopped when a discrimination is made that control is not possible to make the maximum temperature (not higher than 560°C) between 100-600°C, on the basis of the temperature and a driving signal.

Nishikori et al. disclose the following claimed limitations:

* wherein the maximum temperature is controlled by controlling a pulse width of a driving signal applied to the heat generating resistor (col 5, lines 16-35, col 9, lines 46-65, col 10, lines 11-67, col 12, lines 12-50, col 17, lines 38-45, figs 1-8) for the purpose maintaining a stabilized ink ejection amount yet achieving a high quality of printing.

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* wherein a temperature of the substrate is measured, driving of heat generating resistor is stopped when a discrimination is made that control is not possible to make the maximum temperature (not higher than 560°C) between 100-600°C on the basis of the temperature and a driving signal (col 5, lines 16-35, col 9, lines 46-65, col 10, lines 11-67, col 12, lines 12-50, col 17, lines 38-45, figs 1-8) for the purpose of achieving high resolution recording operations.

* there is provided driving signal control means for making a maximum temperature at a surface of said protecting film contacted to the ink during driving of said heat generating resistor (col 5, lines 16-35, col 9, lines 46-65, col 10, lines 11-67, col 12, lines 12-50, col 17, lines 38-45, figs 1-8) for the purpose of providing a controls for the recording head temperature and the ink temperature during printing.

* wherein said driving signal control means controls a pulse width of a driving signal applied to said heat generating resistor to control the maximum temperature (col 5, lines 16-35, col 9, lines 46-65, col 10, lines 11-67, col 12, lines 12-50, col 17, lines 38-45, figs 1-8) for the purpose of providing modulated controls for the recording head in accordance with the ink temperature so as to maintain the ejection force at a proper level with high accuracy during printing.

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* wherein said ink jet head substrate includes a temperature detecting element for measuring a temperature of said substrate, and wherein driving of heat generating resistor is stopped when a discrimination is made that control is not possible to make the maximum temperature (not higher than 560°C) between 100-600°C, on the basis of the temperature and a driving signal (col 5, lines 16-35, col 9, lines 46-65, col 10, lines 11-67, col 11, lines 30-38, col 12, lines 12-50, col 17, lines 38-45, figs 1-8) for the purpose of achieving high quality recording operations.

It would have been obvious to one skilled in the art to utilize a maximum temperature that's controlled by controlling a pulse width of a driving signal applied to the heat generating resistor; a temperature of the substrate is measured, driving of heat generating resistor is stopped when a discrimination is made that control is not possible to make the maximum temperature (not higher than 560°C) between 100-600°C on the basis of the temperature and a driving signal; provide a driving signal control means for making a maximum temperature at a surface of said protecting film contacted to the ink during driving of said heat generating resistor; a driving signal control means controls a pulse width of a driving signal applied to said heat generating resistor to control the maximum temperature; and an ink jet head substrate includes a temperature detecting element for measuring a temperature of said substrate, and wherein driving of heat generating resistor is stopped when a discrimination is made that control is not possible to make the maximum temperature (not higher than 560°C) between 100-600°C, on the basis of the temperature and a driving signal, taught by Nishikori et al. into Kline et al.

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for the purpose of maintaining a stabilized ink ejection amount yet achieving a high quality of printing, achieving high resolution recording operations, providing a controls for the recording head temperature and the ink temperature during printing, providing modulated controls for the recording head in accordance with the ink temperature so as to maintain the ejection force at a proper level with high accuracy during printing and achieving high quality recording operations.

4. Claims 4-5 & 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Klein et al. (5,448,273) in view of Hidetaka (JP 10204351).

Kline et al. disclose all of the claimed limitations except for the following:

- * wherein the ink contains chelate agent.

- * wherein the content of the chelate agent is not less than 50 weight ppm and not more than 20 weight %.

Hidetaka discloses the following claimed limitations:

- * wherein the ink contains chelate agent (Abstract) for the purpose of improving printing images.

- * wherein the content of the chelate agent is not less than 50 weight ppm and not more than 20 weight % (Abstract) for the purpose of achieving excellent image recordings.

It would have been obvious to one skilled in the art to utilize an ink that contains chelate agent and that a content of the chelate agent is not less than 50 weight ppm

and not more than 20 weight %, taught by Hidetaka into Kline et al. for the purpose of improving printing images and achieving excellent image recordings.

5. Claims 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Klein et al. as modified by Nishikori et al. (5,880,751) as applied to claim 19 above, and further in view of Hidetaka (JP 10204351).

Kline et al. as modified by Nishikori et al. disclose all of the claimed limitations except for the following:

- * wherein the ink contains chelate agent.
- * wherein the content of the chelate agent is not less than 50 weight ppm and not more than 20 weight %.

Hidetaka discloses the following claimed limitations:

- * wherein the ink contains chelate agent (Abstract) for the purpose of improving printing images
- * wherein the content of the chelate agent is not less than 50 weight ppm and not more than 20 weight % (Abstract) for the purpose of achieving excellent image recordings.

It would have been obvious to one skilled in the art to utilize an ink that contains chelate agent and that a content of the chelate agent is not less than 50 weight ppm and not more than 20 weight %, taught by Hidetaka into Kline et al. as modified by

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Nishikori et al. for the purpose of improving printing images and achieving excellent image recordings.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to K. Feggins whose telephone number is 703-306-4548. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, N. Le can be reached on 703-308-0750. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

K7
KF

September 18, 2001



N. Le
Supervisory Patent Examiner
Technology Center 2800